How About This Climate We're Having?

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Starting in 1931, dust storms swept across parts of Texas, Oklahoma, Kansas, Colorado, and New Mexico but did not represent a long-term climate change.

Why is it that we never start conversations with, "How about this climate we're having?" It doesn't sound exactly right, does it? That's because "climate" and "weather" are not interchangeable terms. Although closely related, they are in fact very different.

You may want to think of weather as what is happening in any given area in the short-term. For example, a weekend forecast for Chicago may include both stormy and sunny skies. Residents of coastal areas—in places like southern California—are used to seeing heavy morning fog followed by sunshine in the afternoon. These kinds of changes are not unusual. In fact, people in most places know that they can expect a variety of weather patterns during a single week or even during a day.

Climate, on the other hand, refers to the average weather conditions in a region over the long term. Climate is determined by the workings of a system that is composed of the atmosphere, oceans, ice sheets, land, and the plants and people that inhabit the earth. The oceans, for example, affect climate by storing and releasing heat that affects the atmosphere, which in turn makes some parts of the world wetter than others and/or warmer. Another example is rainforests, which affect precipitation in a region.

To determine a particular region's climate, researchers track weather patterns in that region over a number of years. Random variations in the weather from year to year usually balance out and therefore do not affect the long-term average climate.

Natural Fluctuations

Sometimes abnormal temperature or rainfall persists for a few years or even a decade. We can think of these slow shifts in average weather conditions as climate fluctuations. One example of a climate fluctuation is the Dust Bowl of the 1930s in the United States. Although the drought and accompanying dust storms caused hundreds of thousands of people to leave their homes, the Dust Bowl lasted only a few years and did not represent a long-term change in climate. Other things that might cause natural fluctuations include volcanic eruptions and changes in ocean circulation patterns.

Climate varies not only from year to year and decade to decade but also on time scales of centuries or longer. Great continental ice sheets have appeared and disappeared over the last several million years. What causes these and other climate-related variations? A number of factors are involved. Changes in the amount of sunshine that reaches the earth and changes in the earth's orbit may lead to long-term changes in climate.

Water vapor and certain gases in the atmosphere, such as carbon dioxide, nitrous oxide, and methane also are implicated in climate change. These gases trap heat in the atmosphere, causing it to warm. Because their heat-trapping qualities more or less resemble those of the glass in a greenhouse, these gases are often referred to as "greenhouse gases." Some greenhouse gases result from fossil fuel burning. Most climate scientists believe these human-generated gases may have an impact on the long-term climate system.

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